CLAIMS:

1. A pressure sensor device, comprising:

an elongate catheter having

a first lumen adapted to accommodate fluid flow therethrough; and

a second, separate, fluid-filled, fluid-impermeable, sealed lumen extending between a pressure-sensitive component adapted to be exposed to an external pressure source, and a pressure sensor that is effective to measure pressure of the external pressure source in response to displacement of the pressure-sensitive component.

2. The device of claim 1, wherein the elongate catheter includes a sidewall extending between proximal and distal ends, and the first lumen extends through the elongate catheter and includes at least one fluid-entry port formed through the sidewall at or adjacent to a distal end of the catheter.

3. The device of claim 1, wherein the pressure-sensitive component is disposed at a distal end of the second lumen, and the pressure sensor is coupled to a proximal end of the second lumen.

4. The device of claim 1, wherein the pressure-sensitive component includes a first surface in contact with fluid within the second lumen, and a second, opposed surface adapted to be exposed to an external pressure source.

5. The device of claim 4, wherein the pressure-sensitive component comprises a flexible membrane.

6. The device of claim 5, wherein the flexible membrane is disposed across an opening formed in the sidewall of the catheter.

7. The device of claim 5, wherein the flexible membrane has a compliance that is in the range of about 0.05 μL/mmHg to 2 μL/mmHg.

8. The device of claim 5, wherein the flexible membrane is formed from a material selected from the group consisting of polyurethane, silicone, and solvent-based polymer solutions.

9. The device of claim 1, wherein the second lumen contains a predetermined volume of fluid.

10. The device of claim 9, wherein the second lumen is free of voids.

11. The device of claim 9, wherein the volume of fluid in the second lumen is in the range of about 1 μL to 10 μL.

12. The device of claim 1, wherein the fluid in the second lumen is a low viscosity silicone fluid.

13. The device of claim 1, wherein the fluid in the second lumen is a biocompatible fluid.

14. The device of claim 1, wherein the fluid in the second lumen has an average kinematic viscosity in the range of about 5 cs to 20 cs.

15. The device of claim 1, wherein the second lumen has a diameter that is less than a diameter of the first lumen.

16. The device of claim 1, wherein the second lumen has a diameter that is in the range of about 0.1 mm to 0.3 mm, and the second lumen has a length that is in the range of about 8 cm to 20 cm.

17. The device of claim 1, wherein the catheter has a compliance that is less than a compliance of the pressure-sensitive component.

18. The device of claim 1, wherein the catheter has a low compliance such that it is not susceptible to deformation as a result of exposure to the external pressure source.

19. The device of claim 1, wherein the pressure sensor has a frequency response that is greater than 20 Hz.

20. The device of claim 1, wherein the pressure sensor has a compliance that is in the range of about 0.1 μL/mmHg to 0.02 μL/mmHg.

21. The device of claim 1, wherein the pressure-sensitive component comprises a flexible sleeve that is formed around a distal end of the catheter and that is in fluid communication with the second lumen.

22. An intra-ventricular catheter, comprising:

an elongate member having a first lumen adapted to accommodate fluid flow therethrough, and a second, fluid-sealed lumen having a pressure sensor coupled to a flexible membrane disposed at a distal end of the catheter and that is adapted to respond to intra-ventricular pressure changes when the catheter is implanted within a patient's ventricle such that direct pressure readings of the intra-ventricular pressure can be measured.

23. The intra-ventricular catheter of claim 22, wherein the pressure sensor is coupled to a proximal end of the second, fluid-sealed lumen.

24. The intra-ventricular catheter of claim 23, wherein the flexible membrane is formed across a discontinuity formed in a sidewall of the catheter.

25. The intra-ventricular catheter of claim 22, wherein the flexible membrane has a compliance that is in the range of about 0.05 μL/mmHg to 2 μL/mmHg.

26. The intra-ventricular catheter of claim 22, wherein the second lumen contains fluid having a low viscosity.

27. The intra-ventricular catheter of claim 22, wherein the pressure sensor has a frequency response that is greater than 20 Hz.

28. The intra-ventricular catheter of claim 22, wherein the pressure-sensitive component comprises a flexible sleeve that is formed around a distal end of the catheter and that is in fluid communication with the second lumen.

29. A method for measuring intra-ventricular pressure, comprising:

providing a ventricular catheter having

a first lumen adapted to accommodate fluid flow therethrough, and

a second, fluid-sealed, fluid-impermeable lumen extending between a distal, pressure-sensitive member adapted to respond to pressure changes in a patient's ventricle, and a proximal pressure sensor adapted to measure the pressure changes;

implanting the ventricular catheter in a patient's ventricle such that the pressure-sensitive member is disposed within the ventricle and the pressure sensor is disposed at a location outside of the ventricle; and

obtaining at least one reading of the pressure within the patient's ventricle.

30. The method of claim 29, wherein the pressure-sensitive member comprises a flexible membrane that is formed across a discontinuity formed in a sidewall of the catheter.

31. The method of claim 30, wherein the flexible membrane has a compliance that is in the range of about 0.05 μL/mmHg to 2 μL/mmHg.

32. The method of claim 29, wherein the second lumen contains fluid having a low viscosity.

33. The method of claim 29, wherein the pressure sensor has a frequency response that is greater than about 20 Hz.

34. A method of manufacturing an intra-ventricular pressure sensor device, comprising:

forming a catheter having a first lumen adapted to receive fluid flow therethrough, and a second lumen extending between a proximal, pressure sensor and a distal end in communication with an opening formed in a sidewall of the catheter;

filling the second lumen of the catheter with fluid;

spraying a solvent-based silicone solution over the opening formed in the sidewall of the catheter to form a flexible membrane that is effective to seal the fluid within the second lumen in the catheter.

35. The method of claim 34, further comprising the step of removing any voids in the second lumen after the second lumen is filled with fluid.